Environmental Effects of Further Trade Liberalization in Agriculture*

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Abstract

This paper provides a brief summary of how environmental concerns were accommodated into the Uruguay Round Agreement on Agriculture and the U.S. trade liberalization objectives at the Seattle Ministerial Conference. Empirical evidence suggests that the environmental impacts of trade liberalization will vary by country, sector, type of pollutant, and trade policy instrument. By coordinating trade and environmental policy instruments, countries can preserve the economic gains from expanded trade while mitigating adverse environmental impacts and promoting a more sustainable pattern of resource use.

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Executive Summary

- The events surrounding the negotiations of the World Trade Organization's Seattle Ministerial Conference highlighted environmentalists' concerns that liberalizing trade will degrade environmental quality and contribute to an unsustainable pattern of natural resource use.

- In Seattle the United States proposed that further liberalization in agricultural trade could be accomplished by improving market access, enhancing competition in export markets, and reducing domestic support to the agricultural sector.

- Further liberalization of agricultural trade can affect environmental quality and the pattern of natural resource use through several, possibly offsetting, effects. Further agricultural trade liberalization can affect the scale of production, the composition of goods produced in an economy, and the technologies used to produce output.

- By expanding the scale of production, trade liberalization can increase pollution. However, countervailing forces will tend to offset the scale effect by encouraging an economy to use cleaner technologies to produce output and by encouraging specialization in the production of less pollution-intensive goods.

- Empirical evidence from the agricultural and manufacturing sectors suggests that the net effect of trade liberalization will vary by sector, country, type of pollutant, and trade policy instrument.

- Even when a liberalized trade regime exacerbates domestic pollution, erecting trade barriers is not a preferred approach to mitigate environmental quality. Domestic environmental policy tools should be targeted at internal market failures, while maintaining free trade externally.

- By coordinating trade and environmental policies, a country can generate economic gains associated with freer trade while using domestic environmental policies to mitigate environmental quality and to promote a more sustainable pattern of natural resource use.

Environmental Effects of Further Trade Liberalization in Agriculture

At the 1996 Seattle Ministerial Conference the effect of agricultural trade liberalization on domestic and global pollution was again raised as an issue. The objectives of this paper are to:

(1) briefly review how environmental concerns were accommodated in the Uruguay Round Agreement on Agriculture;

(2) summarize U.S. agricultural trade liberalization objectives at the Seattle Ministerial Conference;

(3) present a standard approach adopted by economists to assess the environmental and natural resource effects of trade liberalization;

(4) selectively survey the empirical evidence on the environmental effects of trade liberalization, both in agriculture and in manufacturing; and (5) draw conclusions and policy implications from this evidence.

1. Accommodating Environmental Concerns in the Uruguay Round

The eighth round of multilateral trade negotiations, also called the Uruguay Round, resulted in sweeping reforms of the global agricultural trading system. Under the provisions of the Uruguay Round, countries agreed to substantially reduce agricultural support and protection, establish disciplines on the use of sanitary and phytosanitary (SPS) measures, and create a dispute settlement body to arbitrate trade disputes (Normile and Simone, 1999). Specific to agricultural policy reform, the Uruguay Round Agreement on Agriculture (URAA) established new disciplines in the areas of market access, export competition, and domestic support (Josling and Tangerman, 1999).

Market Access Provisions of the URAA: The adoption of a "tariffs-only" approach was a sweeping reform adopted under the URAA (Wainio, 1999). Countries agreed to prohibit non-tariff barriers, convert existing non-tariff barriers into tariffs, and reduce tariffs over the implementation period. New and existing tariffs were bound and reduced on average by 36 percent over the six-year implementation period (1995-2000). Tariff–rate quotas (TRQ's) were also instituted to provide assurance of continued or new market access.

Export Competition Provisions of the URAA: The URAA committed WTO member countries that employed export subsidies to lower the volume and value of subsidized exports (Leetmaa and Ackerman, 1999). Total expenditure on export subsidies was scheduled to fall by 36 percent and the volume of subsidized exports was scheduled to decline by 21 percent over the implementation period.

Domestic Support Provisions of the URAA: In addition, the URAA also contained provisions for countries to cut trade-distorting domestic support provided to agricultural production. Such support to producers of agricultural products was scheduled to decline by 20 percent over the implementation period. Countries agreed to national limits on trade-distorting domestic support, although no limits were placed on expenditures on any particular program.

Environmental Accommodation within the URAA: To maintain flexibility for achieving certain national objectives, the URAA allowed governments to place qualifying domestic expenditures in the "green box," which were exempt from negotiated reductions in domestic support (Nelson et al, 1998). Expenditures on programs such as domestic food aid, public stockholding for food security, research and extension, environmental

protection, natural resource conservation, and natural disaster relief qualified for placement in the WTO's green box.

Both environmental protection and natural resource conservation were recognized as legitimate domestic policy goals under the URAA. To qualify for placement in the green box, an environmental policy had to: a) establish clearly defined environmental and natural resource objectives, b) limit payments only to the extra cost of complying with the government program, c) have no, or at most minimal, effects on production and trade, d) be financed by the Federal budget, and e) not increase market prices or consumer costs (Vasavada and Warmerdam, 1999). Alternative criteria for placing programs in the green box are discussed elsewhere (Ervin, 1999, Runge, 1999).

Many WTO member countries have placed their payments on environmental and natural resource conservation programs in the WTO's green box, thereby exempting them from reductions in trade-distorting domestic support. In 1996, 35 percent of notifying countries reported expenditures on environmental programs and 16 percent of notifying countries reported expenditures on resource retirement programs (WTO, 1998).

Notwithstanding these concrete accomplishments of the URAA, both on the trade liberalization and environmental accommodation fronts, concerns continue to be voiced about the environmental and natural resource impacts of trade liberalization (Martin, 1999). These concerns have been raised by environmentalist non-governmental organizations and were reiterated by protesters in Seattle.

2. U.S. Agricultural Trade Liberalization Objectives

Future trade liberalization negotiations will focus on a number of pending issues. While the URAA advanced the free trade agenda by starting to dismantle some agricultural trade barriers, many issues remain to be resolved. Building on the gains achieved during the eighth round, in Seattle the United States sought implementation of concrete plans to further liberalize agricultural trade (USTR, 1999). Three U.S. objectives that may directly affect the environment pertain to market access, export competition, and domestic support. As part of the built-in agenda the Committee on Agriculture will meet in Marchy to form an Agriculture Negotiating Group, so future progress is at least possible.

U.S. Market Objectives in Agricultural Negotiations: A variety of approaches can be adopted to improve market access. These are: lower tariff rates further and bind them, expand market access opportunities for products subject to tariff-rate quotas; reduce the disparity between applied and bound tariff rates; simplify complex tariff regimes; establish greater certainty and transparency in complex tariff regimes; and establish disciplines governing administration of TRQ's (USTR, 1999).

U.S. Export Objectives in Agricultural Negotiations: Several measures can be adopted to enhance competition in export markets. These are: complete elimination of agricultural export subsidies; improve transparency in the operations of exporting state trading enterprises; establish stronger disciplines on the monopoly activities of state trading enterprises; and terminate the use of export taxes applied in a sporadic and distortive manner on specific agricultural products (USTR, 1999).

U.S. Domestic Support Objectives in Agricultural Negotiations: Further trade liberalization can be achieved by substantially reducing trade-distorting domestic support and by disciplining production-related support with stronger rules. Exemption for minimally trade-distorting domestic support to pursue legitimate domestic policy goals can continue, by preserving criteria-based green box policies (USTR, 1999).

3. Assessing the Environmental Impacts of Further Trade Liberalization

Trade liberalization can have several, possibly offsetting, impacts on the environment and on natural resource use. Following trade liberalization, a country may expand or contract the scale of agricultural production, specialize towards or away from the production of relatively pollution-intensive or natural resource-degrading agricultural commodities, or use cleaner/dirtier technologies to produce agricultural commodities (Copeland and Taylor, 1994).

Scale Effect: Opening an economy to trade can stimulate the level of domestic activity, contributing to an increase in production for all sectors of an economy. The scale effect will tend to increase environmental pollution and accelerate natural resource degradation. To the extent that this increased output raises per capita income, however, it will increase domestic demand not only for consumer goods but environmental amenities, e.g. clean air, clean water, etc, as well. One way to produce amenities is to enact and enforce stricter environmental regulations. Indeed, as the industrialized countries developed and became wealthier each adopted increasingly strict environmental regulations reflecting consumers increased willingness to pay for them. As such income growth associated

with increasing levels of economic activity may serve as a countervailing force and mitigate environmental pollution.

Composition Effect: Trade liberalization can also affect the composition of output produced in an economy. Some outputs are more pollution-intensive or natural resource-degrading than others. It is possible that countries with lax environmental regulations will tend to specialize in the production of even more pollution-intensive goods than before trade liberalization. However, the composition effect can also work in the opposite direction, making the composition effect ambiguous.

Technique Effect: Following trade liberalization, a country may adopt cleaner or dirtier production methods. This is the technique effect, which can cause an upgrading or downgrading of environmental standards. This can happen because:

a) consumer income grows as a result of moving to a more efficient and open economy, triggering new demands for environmental regulation (Grossman, 1994);
b) producers alter production techniques to respond to changing relative prices, thereby altering polluting input use (Anderson, 1992);
c) foreign direct investment increases, possibly involving new investments by foreign firms which utilize cleaner technologies to produce output (Leonard, 1988); and
d) countries may lower their environmental standards to improve the competitiveness of their producers, thereby increasing pollution (Barrett, 1994).

Transportation Effect: Trade liberalization may also affect transport movements as larger shipments of agricultural commodities are moved between countries (Batra, Beladi, and Frasca, 1998; OECD, 1999). Alternative forms of transportation (air, sea, land) differ in their pollution-intensities; so, the overall effect of this transportation effect

will depend on which forms of transportation are utilized in the post trade liberalization situation.

On balance, the impact of trade liberalization in agricultural products will depend on the relative strengths of the scale, composition, technique, and transportation effects. Some of these effects will have a tendency to raise the level of pollution and others will work in the opposite direction. Economists have attempted to measure the relative intensities of these effects for different sectors and in different countries.

4. The Complementary Role of Environmental and Trade Policies

By opening its economy to new trading opportunities, a country can potentially improve its economic welfare. Even when other countries erect trade barriers, a country's economic welfare will, with some notable exceptions, usually improve by unilaterally pursuing free trade (Krugman, 1997).

The environmentalists' case against free trade is founded on the belief that free trade accelerates environmental degradation. Some economists have suggested that the presumed welfare gains from free trade are overstated and accrue only when markets function perfectly and capital is freely mobile (Daly and Goodland, 1994). These conditions are seldom observed in the real world, where markets may under-price natural resources and environmental services, and numerous impediments to capital mobility are also observed.

Others have suggested that a free trade regime can compound over-exploitation of scarce natural resources, such as tropical forest products, in countries without clearly defined property rights and lax enforcement (Giordano, 1994). Such countries will tend

to possess a comparative advantage in producing natural resource-degrading products (Chichilnisky, 1994). Weak property rights, combined with lax enforcement of environmental regulations, will deter a country that adopts free trade from following a sustainable path of natural resource extraction. While not immediately obvious, clearly defined property rights constitute a vital component of a successful domestic environmental policy. For example, tropical deforestation in Brazil is exacerbated by the lack of clearly defined property rights for large tracts of the rain forest. Even worse, clearing the land is often the only way to establish ownership. Since ownership of the forest is unassigned, no one has an incentive to pursue more sustainable forest management practices. If ownership of the land were assigned, then the benefits of the standing forest would accrue to the owner and thereby greatly reduce the incentive to clear-cut and likelihood of a market failure.

Free traders argue that, even when markets fail to correctly price natural resources and the environment, protecting an economy by erecting a trade barrier is never the best policy response. If the market failure arises in domestic markets, then domestic environmental policy tools should be directly targeted at the market failure, while free trade is maintained externally (Bhagwati, 1971).

5. Empirical Evidence on the Environmental Effects of Trade Liberalization

The overall effect of agricultural trade liberalization is an empirical question and involves an assessment of the relative strengths of multiple effects for different sectors, pollutants, and countries. While the tuna-dolphin (Krissoff, et. al, 1996) and the shrimp-turtle (Arden-Clark, 1998) provide sensational cases, few studies have systematically analyzed

this issue for the agricultural sector. A relatively larger number have investigated scale, composition, technique, and transportation effects in the manufacturing sector.

Evidence from Manufacturing: Based on a review of studies on the manufacturing sector, Beghin and Poitier (1997) conclude that "trade liberalization will not induce wholesale specialization in dirty manufacturing industries in the developing world." Country level studies also provide some guidance on the impact of trade liberalization. A recent study found that Uruguay Round policy reform in Indonesia had favorable repercussions on the environment and natural resource use, especially with respect to air pollution, water pollution, and water use (Strutt and Anderson, 1999). A strong composition effect is shown to outweigh the scale effect in this case.

A recent cross-country analysis finds that pollution-intensive output as a percentage of total manufacturing has fallen considerably in OECD countries and risen steadily in the developing world (Mani and Wheeler, 1999). However, this same study found that any tendency towards formation of pollution havens tended to be self-limiting, because the income growth that free trade promotes causes an increase in demand for environmental amenities. This increase in demand typically manifests itself through increased environmental regulations that induce firms to invest in cleaner production methods. This suggests that developing countries may experience a temporary increase in pollution before they are willing to enact and enforce the expensive pollution abatement policies industrialized countries find affordable. Trade liberalization can also contribute to the international diffusion of clean technologies as Wheeler and Martin (1992) document in the case of wood pulp production. In this instance the positive technique effect resulted minimized any immediate environmental impacts.

Levinson (1996) presents a comprehensive analysis and review of industrial flight in the manufacturing sector and finds that the overwhelming body of evidence does not suggest industrial movements in response to diverse international and domestic environmental regulations.

Trade liberalization can increase per capita income, which may result in an increased demand for higher standards for environmental protection and natural resource conservation. Countries will likely experience an initial phase of environmental deterioration followed by a subsequent phase of environmental upgrading, suggesting that sustained trade liberalization can contribute to environmental and natural resource conservation goals, at least in the long-term (Grossman and Krueger, 1995).

Researchers have also examined the effect of the Uruguay Round on global pollution. One study found that liberalization reduces global pollution moderately, by eliminating overproduction in protected dirty activities, and by reallocating dirty production from developing to developed countries (Ferrantino and Linkins, 1999). This study considers scale, composition, and technique effects.

Another study reports ambiguous results, with the finding that the total effect of trade liberalization varies by type of pollutant (nitrogen dioxide, carbon monoxide, sulphur dioxide) and by region (Cole, Rayner, and Bates, 1998). This study also decomposes total effects into scale, composition, and technique effects.

Evidence from Agriculture: Within agriculture, empirical studies vary in country, product, and sector coverage; type and degree of trade liberalization; baseline assumptions; and the degree to which environmental variables are included (Krissoff et

al, 1996). This limits the capacity to draw general conclusions from the agricultural trade liberalization literature.

One study finds that not only will trade liberalization in the food sector generate large global income gains but it will also likely reduce global environmental and natural resource damage from farming (Anderson, 1992). Under multilateral trade liberalization, world food production shifts from developed to developing countries, which use more labor instead of chemicals in food production. Also, tropical deforestation in developing countries does not accelerate following trade liberalization because agricultural land use is not very responsive to agricultural product price changes.

The environmental effects of agriculture trade liberalization will depend on the extent to which commodity production shifts from inefficient (high cost) countries to efficient (low cost) countries. For example, some countries may experience an increase in the relative price of agricultural commodities, thereby spurring agricultural production and accelerating environmental degradation (Lopez, 1994), unless tighter environmental standards are concurrently adopted.

More recently, the effect of agricultural trade liberalization on domestic pollution was examined (OECD, 1998). In general, OECD countries with high levels of pesticide use experience a reduction in pesticide use, if Uruguay Round commitments are extended beyond the last year of the implementation period. The converse is true for countries with low levels of pesticide use, which increase agricultural production as a response to changing relative prices. Similar findings are reported for nitrogen surplus in OECD countries, which declines for high nitrogen surplus countries but increases for low nitrogen surplus countries.

Based on an application to economic integration by Western Hemisphere countries, Gray, Krissoff, and Tsigas (1996) found that freer agricultural trade can reduce environmental quality in Mexico and Brazil, unless trade liberalization is combined with more stringent environmental policies. Their analysis shows that the welfare gains from economic integration increase when trade liberalization is coupled with harmonization of environmental policies by Western Hemisphere countries (U.S., Canada, Mexico, Argentina, and Brazil).

The importance of coordinating trade and environmental policies has also been emphasized in another recent study, which focused on the U.S. experience (Office of Technology Assessment, 1995). This study concludes that "…efforts to expand agricultural trade and upgrade environmental quality can complement each other, if appropriate environmental management programs that target significant environmental problems and focus on low-cost solutions are properly run."

6. Conclusions and Policy Implications

A brief review of the empirical evidence on environmental effects of trade liberalization suggests several conclusions. These are: 1) the overall impact of trade liberalization on the environment will depend on the relative strengths of several, possibly offsetting, effects; 2) impacts on the environment will vary by sector, country, type of pollutant, and trade policy instrument; 3) trade liberalization may affect both domestic and global pollution; and 4) coordinating trade and environmental policies can preserve economic gains while mitigating environmental damage and promoting a more sustainable pattern of natural resource use.

Given that freer agricultural trade can trigger several, possibly offsetting, effects on the environment and on natural resource use, the appropriate policy response merits additional discussion. Economists have debated whether trade policy should be used to elicit positive environmental outcomes.

Even when freer trade in agricultural markets exacerbates domestic environmental problems, countries may effectively deal with their environmental and natural resource concerns by coordinating trade and environmental policy tools. For example, strong property rights may be instituted and environmental regulations could be strictly enforced, while maintaining free trade in external markets. Within agriculture, since green box compatible policies are exempt from negotiated reductions in domestic support, an added opportunity is available to WTO member countries to complement trade reform with environmental reform.

Cooperative multilateral solutions are the preferred approach to tackling global or trans-boundary environmental problems, if any, stemming from further trade liberalization. Multilateral environmental agreements, if enacted, will facilitate coordination between countries causing, and affected by, global pollution. Multilateral environmental agreements can usually provide a more efficient allocation of global resources, when compared to a non-cooperative approach to reducing global pollution (Escapa and Gutierrez, 1997).

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